

passed over this county on the night of the 12-13th. Trees and telegraph wires were blown down at this place. The damage to property was more extensive in the surrounding country.

Long Branch, New Jersey: the storm of the 13th was felt severely along the northern coast of New Jersey. The beaches for miles were badly washed and much damage was done to the valuable bluff fronting the ocean drive-way.

Tipton, Tipton county, Indiana: during the storm of the 13th the buildings on the fair grounds were blown down and many private residences in the town badly wrecked, killing one person and wounding others. Numbers of horses and cattle were killed by falling trees. In White county the wind was disastrous in its effects, many farms being left without buildings or orchards, and much stock was killed.

Albion, Calhoun county, Michigan: a heavy wind and rain storm occurred at this town at 5.30 p. m. on the 14th, flooding the streets in ten minutes after it began. Five stores were unroofed and their contents damaged by rain.

Fredericksburg, Virginia: the storm of the 14th did considerable damage in this vicinity. Crops, fruit trees, and gardens were destroyed or injured by wind, rain, or hail. Along the north bank of the Rappahannock River, from Leedstown, in Westmoreland county, to the mouth of the river, farm property was damaged by flood and wind.

Saint Louis, Missouri: about 6 p. m. of the 14th a heavy rain and wind storm passed over this city, coming from the west. The rainfall was very heavy, 3.30 inches falling during the storm. All the low land in the city was flooded, and cellars and basements partially filled, doing great damage to their contents.

Lancaster, Fairfield county, Ohio: a destructive storm of wind and rain occurred at this town and vicinity on the night of the 14-15th. A number of business houses and residences were unroofed and two school buildings damaged. In the streets were scattered portions of trees and the debris of buildings. Reports from the surrounding country show great injury to wheat and other crops.

By reference to the descriptions of storms, etc., in this REVIEW, under the headings of "Local storms and tornadoes," "Floods," and "Hail," it will be seen that the most severe atmospheric disturbances of the month occurred during the prevalence of this area of low pressure.

VI.—When the low area previously described was central over northern Illinois, number vi appeared to the north of Manitoba and moved southward over Minnesota, while a secondary depression formed over eastern Kansas and moved northeastward over Iowa. This depression was trough-shaped and moved slowly eastward during the 13th, crossing the Mississippi Valley, with the principal depression moving southward from Minnesota to central Illinois, and a secondary depression moving eastward north of the upper lake region. During the 14th this storm increased in energy, and moved slowly to the northeastward, north of the Ohio Valley, attended by general rains and severe storms from Tennessee and Arkansas northward to the Lake region. On the 15th it moved slowly down the Saint Lawrence Valley, attended by increasing pressure at the centre of disturbance. This storm attained its maximum energy while passing over the Lake region, the barometer reading a minimum of 29.43 at Montreal, Province of Quebec, on the morning of the 15th. The barometric pressure on the New England coast ranged from 30.00 to 30.13. This disturbance was last observed north of the lower Saint Lawrence Valley, apparently moving to the northeast.

VII.—On the 18th this area of low pressure apparently moved northward over the Gulf of Mexico, causing dangerous winds on the east Gulf coast. It moved slowly northward over Mississippi and northern Alabama during the 18th, 19th, and 20th, the barometric gradient being very slight. The centre of depression was located approximately by the directions of winds at neighboring stations. This area disappeared on the 21st in southern Alabama, although the succeeding tri-daily reports show local storms in Georgia and Alabama on that date.

VIII and IX.—These areas of low pressure probably passed from the north Pacific coast eastward to the Atlantic north of the stations of observation. They followed each other with an interval of thirty-two hours, moving eastward in the same latitude, and were attended by no marked change in the weather conditions within the United States, except in the region west of Lake Superior. They appeared north of Montana, and on the mornings of the 18th and 19th, respectively, and they disappeared on the 21st, north of the Saint Lawrence Valley.

X.—Number x was located east of, and near, the New England coast on the afternoon of the 25th. The tri-daily

reports on the 24th and morning of the 25th indicate the presence of a feeble depression on the middle Atlantic coast. The movement was slowly to the northward, and at midnight of the 24th the centre of this disturbance was apparently over eastern New York. Between midnight of the 24th and 7 a. m. of the 25th the movement was easterly, but on the afternoon of the 25th it was clearly defined as a disturbance of considerable energy. It moved northward to Eastport, Maine, and thence northwestward during the succeeding sixteen hours, when the centre moved to the west of the Saint Lawrence River, near Father Point, Province of Quebec. During this northwest movement the barometer fell from 29.42 to 29.26, and dangerous winds occurred at stations within the disturbance; the winds also reached velocities ranging from thirty to forty-four miles per hour on the New England coast. This storm apparently moved northward from the Saint Lawrence Valley, although a secondary depression formed to the southwest on the 27th, and passed directly eastward to the New England coast.

XI.—Number xi appeared north of Manitoba on the morning of the 28th. It remained north of the stations of observation, moving slightly to the south of east until it reached the meridian of Washington, and latitude 49°, after which the course changed to the north of east, and it passed beyond the limits of the stations during the 30th. It was at no time central within the United States. When the centre reached the most southerly point of its course strong westerly winds occurred in the upper lake region. The barometer was below 29.50 in Manitoba when the depression passed over that section, and it was above 29.70 when the centre was in the lower Saint Lawrence Valley.

NORTH ATLANTIC STORMS DURING MAY, 1886.

[Pressure in inches and millimetres; wind-force by Beaufort scale.]

The paths of the depressions that have appeared over the north Atlantic Ocean during the month are determined, approximately, from international simultaneous observations furnished by captains of ocean steamships and sailing vessels; abstracts of ships' logs and other data collected by the Signal Service agencies at the ports of New York, Boston, and Philadelphia; reports received through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs furnished by the proprietors of the "New York Maritime Register," and from other miscellaneous data received at this office up to June 21, 1886.

Of the ten depressions traced during the month, one, number 9, is a continuation of areas of low pressure traced on the North American continent; number 1 first appears off the coast of the United States in N. 34°; number 2 is a continuation of depression number 11, described as a north Atlantic storm for April, 1886; number 3 developed near N. 36°, W. 47°; numbers 4 and 5 originated over the ocean west of W. 55°; number 6 is first charted in N. 55°, W. 24°; numbers 7 and 9 appeared off the southeast coast of Ireland, and number 10 is traced off the northwest coast of Spain.

The following presents the characteristics of the depressions traced for the present month as compared with those traced over the north Atlantic for May, 1885:

In May, 1885, ten depressions were traced; the general direction of the movement of the storm-centres being east-northeasterly, excepting those which first appeared near the British coasts; these moving south of east. East of the fiftieth meridian the tracks were located within a path bounded by N. 40° and N. 55°.

In May, 1886, the positions of storm-tracks were greatly diversified, extending from N. 36° to N. 60° from the fiftieth meridian to the European coast; their general direction being east-northeast, with a rather rapid rate of progression, except in the case of depression number 1, which made slow progress after passing the thirty-fifth meridian. One depression, number 8, disappeared over the ocean northeast of Newfoundland, and one, number 4, pursued a southerly course from N. 37°,

W. 55°. In no instance were pressures below 29.00 (736.5) reported.

The month opened with an area of low pressure off the coast of the United States, accompanied by moderate to fresh gales. A second depression of considerable energy and widely extended influence was central in about N. 47°, W. 34°. These depressions caused generally low pressures and unsettled weather between N. 35° and N. 55° until the 3d, when an area of high pressure appeared off the southeastern coast of the United States; extending eastward over the ocean, this area of high was succeeded by lower pressure off the coast of the United States from the 7th to the 10th. During the first ten days of the month the weather was generally unsettled east of the fortieth meridian, with moderate gales and rain. Fresh northerly gales and rain were encountered in N. 40°, W. 40° to 55°, and N. 48° to 50°, W. 25° to 30°, on the 11th.

A region of low pressure was located south of the West Indies from the 7th to 10th, inclusive.

On the 12th a storm of great energy developed off the southeast coast of Ireland. On the 13th this storm had moved south-eastward, exhibiting barometric pressure 29.18 (741.2), and was accompanied by wind of force 9 and 10 and rain. On the 14th strong northerly gales continued off the eastern coast of Ireland, diminishing in force during the two succeeding days. This storm appeared too far to the eastward to admit of charting on the ocean storm-track map, but its development was probably subsidiary to charted depression number 1, which disappeared to the eastward of the British Isles on the 11th. From the 11th to the 20th the pressure increased over the mid-Atlantic, south of the fiftieth parallel, and numerous rain-areas and moderate gales were encountered. From the 20th to the 25th comparatively fair weather prevailed from coast to coast, some rain being reported over the mid-Atlantic from N. 50° to 60°. From the 25th to the close of the month no special features are noted, save the development on the 30th of a depression off the northwestern coast of Spain.

The following are brief descriptions of the depressions charted:

1.—This storm is traced entirely across the north Atlantic, and is first charted, on the 1st, off the coast of the United States in N. 34°, W. 76°. On the morning of that date, pressures ranging below 29.60 (751.8) are exhibited. Under this date the following reports are made in connection with this storm:

Capt. N. S. Tracy, commanding American brig "Teneriffe," situated in N. 36°, W. 74°: "All night it has been blowing terrific squalls, with thunder and lightning; total darkness and a very bad sea."

The s. s. "Halley," W. P. Ballantine, commanding, in N. 35° 28', W. 71° 03', encountered a hurricane, beginning at 8 p. m. of the 1st, and continuing until noon of the 2d. The wind set in from the southwest and veered to the northeast, lowest barometer 29.38 (746.2), at 4 p. m. of the 2d.

The brig "John McDermott," in N. 34°, W. 74°, experienced a heavy gale from the n. to nw., with very heavy seas.

The schooner "Seventy-six," in N. 29°, W. 64° 30', encountered heavy nw. gales, which continued three days.

Captain Macon, commanding the s. s. "Lone Star," makes the following report: "N. 28° 26', W. 79° 40', from April 30th to May 3d; lowest barometer, 29.58 (751.3), at 12 midnight (Greenwich mean time) of April 30th. This was the heaviest gale I remember for the time of year; with very heavy cross seas n. to e. ne.; squalls of the heaviest kind. The wind set in from the w., veering to nw. and n.; winds following n., ne. to se., and s."

S. S. "Manhattan," Frank Stevens, commanding: "N. 34° 04', W. 76° 55', 5.02 a. m., wind shifted suddenly from se. to sw. in a violent squall; wind blowing with great force, and heavy rain, with sharplightning and heavy thunder; barometer had fallen to 29.42 (747.3) before it struck. Gale lasted two hours, hauling gradually to nw., blowing hard and clearing off."

On the morning of the 2d this depression had moved east-northeast, to N. 36°, W. 69°, with energy unabated. Under this date reports are made as follows:

The schooner "Joseph W. Foster," in N. 38°, W. 73°, experienced a heavy gale from the nne., lasting thirty-six hours, during which a terrific sea struck the vessel, breaking the rudder, flooding the cabin, and washing everything movable from the deck.

Capt. N. S. Tracy, commanding brig "Teneriffe," states that "in thirty-two years' experience, as master, he never saw such weather. It was a cold north gale, with very heavy rain and heavy confused sea running from n. to e."

Heavy rain and strong east to northeast gales were encountered by vessels to the northward and northwestward of the storm-centre during the 2d.

On the morning of the 3d the low area had advanced e. ne. to N. 38°, W. 59°, with a central pressure of about 29.40 (746.7); strong gales and rain continuing east of the seventy-fifth meridian. On this date the bark "Mary E. Hall," in N. 34°, W. 73°, had a heavy gale from the west, lasting forty-eight hours. Everything on deck was washed away; sails split and cabin flooded.

W. H. Eills, commanding the s. s. "Capulet," reports: "In N. 39° 50', W. 55° 12', experienced a north gale; 9 a. m., wind ne., force 6, heavy rain, barometer 29.80 (756.9); 9 to 11 a. m., wind steady in direction from ne., gradually increasing in force; 11 a. m. to 2 p. m., gale increased, with heavy squalls at force 9 to 10, and continuous heavy rain, and high, true sea from ne., barometer steady at 29.80 (756.9); 2.30 p. m., wind decreased to force 6, and suddenly veered to nw., w., sw., and w., then fell light to force 3, weather clearing to westerly; 3 to 4 p. m., wind veered round to nw. and n. to ne., increasing rapidly, with rain, gale blowing with force 9, with squalls at force 10 to 11, with continuous heavy rain, high confused sea from ne., barometer 29.75 (755.6); 7 p. m., gale increased to force 10, with very high sea from ne., rain and misty weather; 9 p. m., wind increased to force 11, barometer 29.70 (754.4); 9 to 12 midnight, gale decreased to force 9, barometer at midnight 29.60 (751.8), followed on the 4th by increasing pressure and wind backing to nw."

At noon (Greenwich mean time) of the 4th this storm was central in N. 41°, W. 48° 30', with an increase of barometric pressure, and a slight loss of energy. Strong gales and rain were reported to the eastward, and rain to the north and northward. Under this date Capt. B. Jamieson, commanding s. s. "Sidonian," reports: "In N. 41° 44', W. 39° 09', at noon, fresh gales began from se., veering to sw." The s. s. "Ponca," Capt. William Bowen, in N. 36° 58', W. 40° 48', at 8 a. m. encountered a fresh gale from the south; heavy rain and squally; wind veered to sw. in p. m., and continued moderate gale, rain and squally; barometer 29.78 (756.4) at 9.30 p. m.

At 12 noon (Greenwich mean time) of the 5th the area of low pressure was located in N. 41°, W. 42°, having moved due eastward about 6° since the preceding day, accompanied by strong gales and rain. On this date the s. s. "Ponca," in N. 37° 13', W. 44° 37', encountered strong winds from the sw. and heavy rain. At 8 a. m. the wind veered to nw. and increased to fresh gales at noon, and to strong gales at night; barometer, at 8.45 a. m., read 29.74 (755.4). The s. s. "Sidonian," in N. 42° 0', W. 44° 25', encountered a sw. gale, veering to n. at noon, and increasing to whole gale, which continued with very heavy squalls until 4 a. m. of the 6th, in N. 42° 23', W. 49° 16'; then moderated and backed to nw. and sw., with strong to fresh breeze and fair weather. Lowest barometer during the gale was 29.97 (761.2) from midnight to 6 a. m. of the 5th.

On the 6th this storm was central near N. 45°, W. 36°, with rain to the eastward and northward, and an appreciable increase in pressure. Pursuing a southeasterly course the depression is charted on the 7th to N. 44°, W. 33°, with rain to the northwestward and fresh gales to the west and southwest. During the next twenty-four hours it moved south of east to

N. 43°, W. 28°, with increasing pressure and a marked loss of force. From this point it moved east-northeast to N. 45°, W. 20°, on the 9th, with rain and moderate winds to the north-westward. At 12 noon (Greenwich mean time) the storm-centre had moved northeastward to N. 47°, W. 15°, with rain to the northwestward, and fresh northerly gales to the westward. The pressure had risen decidedly, and the storm lacked violent features. During the 11th this depression disappeared to the eastward of the region of marine reports.

2.—This storm is a continuation of depression number 11, charted for April, 1886, and is taken up, May 1st, in N. 48°, W. 34° 30', with a central barometric pressure of 29.00 (736.6). To the northeastward and eastward fresh gales and rain were reported. On this date the s. s. "Otranto," Captain Rippeth, in N. 49° 36', W. 10° 42', experienced a strong gale from the south, beginning in p. m. and continuing until a. m. of the 2d, in N. 49° 27', W. 16° 35', when it moderated and veered to sw.; lowest barometer, 29.69 (754.1), at noon on the 2d. The s. s. "City of Richmond," A. W. Lewis, commanding, in N. 48° 46', W. 31° 30', had a ne. gale of force 8, commencing at 6 p. m. of the 1st, and continuing until 8 p. m. of the 2d. From the forenoon of the 1st the wind backed to s., se., e., ne., nw., and wnw.; lowest barometer, 29.05 (737.9), at 1 p. m., May 1st.

The s. s. "Austrian," Captain Parker, in N. 51° 7', W. 28° 11', experienced a strong gale from the sse., veering to s., sw., and w., and to nw., following the passage of the disturbance; lowest barometer, 29.15 (740.4), from 2 to 4 a. m., May 2d. The s. s. "Edam," Capt. J. H. Taat, in N. 46° 13', W. 38° 52' encountered a strong gale from the nw., wind veered to nnw. and n., and to ne., following the storm; lowest barometer 29.06 (738.1) at 11 a. m., May 1st. Captain Fulcher, commanding s. s. "City of Truro," makes the following report: "May 1st, in N. 58° 21', W. 26° 42', noon, moderate gale from s., increasing to fresh gale, veering to sw. and moderating at night, then moderate winds and fair weather." At 12 noon (Greenwich mean time) of the 2d the area of lowest pressure had moved northeastward to N. 53°, W. 24°, with fresh to strong gales to the east and northeastward. During the next twenty-four hours the storm-centre moved nne. to N. 60°, W. 18°, passing, during the 3d, beyond the northern limit of reports.

3.—This storm first appeared on the 2d, in N. 36°, W. 47°, with fresh gales to the east and northeastward. On the 3d the centre had moved north of east, to N. 38°, W. 34°, with barometric pressure of about 29.80 (756.9), and fresh gales to the southwestward. The low area then moved northeastward to N. 44°, W. 23°, on the 4th, with an appreciable decrease of energy, the depression being apparently dissipated during this day.

The following reports were made in connection with low pressure number iii, charted as a land depression: S. S. "Dunholm," Captain Wilkinson, by chief officer Wm. Scott: "Left Matanzas May 4th, and had moderate winds and fair weather till May 7th, in N. 33° 23', W. 76° 20'. At midnight fresh gales from ssw. began, with squally weather and rain, and high confused seas, increasing at 4 a. m. on the 8th, in N. 36° 11', W. 73° 34', to strong gale, ssw., accompanied by heavy rain and thunder and lightning, which continued till noon; barometer, 29.75 (755.6), at noon; gale moderated at night. 9th, in N. 38° 55', W. 70° 53', strong breeze, sw., and cloudy; veered to nw., and increased at 8 a. m. to strong gale, nw., and moderated at noon; then moderate winds and fair to Boston."

The s. s. "State of Georgia," G. Moody, commanding, encountered a strong sse. gale at 8 p. m., of the 9th, in N. 41° 25', W. 56° 20'; wind veered from sse. to s., sw., w., and nw. during the 9th and 10th; lowest barometer, 29.64 (752.8), at 9.30 a. m. of the 10th. The s. s. "Sidonian," Capt. B. Jamieson, in N. 42° 30', W. 63° 40', had a whole gale on the 9th; wind set in from the se., and veered to s., sw., w., and uw., the wind blowing heaviest from sw., veering to nw.; lowest barometer, 29.43 (747.5), at 4 p. m. of the 9th. The s. s. "Ancoria," J. J.

Small, commanding, had a fresh gale, commencing 9 p. m. of 9th and ending 5 a. m. of 10th; wind set in se., veering to s., sw., and w.; lowest barometer, 29.59 (751.6), at 6 a. m., May 10th. Capt. William Bowen, commanding s. s. "Ponca," makes report under date of the 9th: "In N. 40° 31', W. 60° 32' (noon), fresh gale began from s., increasing at night to strong gale s.; heavy rain and confused sea; barometer, at 8 a. m., 29.98 (761.5); wind veered to nw. and w. in early a. m. of 10th, in N. 41° 9', W. 64° 27', and increased to whole gale n., with clear weather, and continued until night, then moderated; barometer 29.80 (756.9) at 7.45 a. m. 11th, had fresh to strong breezes and thick and rainy weather to port (Boston)." Mr. Tyrrell, chief officer, "City of Truro," Captain Fulcher, commanding, reports: "9th, in N. 45° 28', W. 58° 55', fresh gale began from se. at noon, with thick fog, rain, and high sea; veered to sw. and moderated at night; then had moderate winds, rain, and fog at intervals." On the 10th this storm passed northeastward beyond the region of observation, probably continuing across the Atlantic as depression number 6, herein and hereafter described. This storm was cabled to London.

4.—This storm developed over the ocean in N. 36°, W. 55°, and is first charted on the 11th. Vessels to the east and northward reported fresh gales and rain. Following a southerly course, the depression was central on the 12th in N. 32°, W. 55°, after which date it passed beyond the limit of reports to the southeastward. No special reports have been received concerning this storm.

5.—Apparently originating in about N. 40°, W. 61°, during the early morning of the 13th, this depression is traced southeastward to N. 38°, W. 57°, on the morning of the 14th; from thence slightly north of east to N. 39°, W. 48°, by the 15th, during which date it disappeared to the eastward. Rain and fresh winds accompanied this depression, but reports at hand fail to associate noteworthy features in connection with its passage.

6.—It is thought that this storm was a continuation of land depression number iii, described in this REVIEW, which, through an absence of reports, it was not possible to trace beyond the eastern coast of Newfoundland. Appearing at 12 noon (Greenwich mean time) of the 15th, in N. 55°, W. 24°, this storm exhibited pressure about 29.47 (748.5), with moderate gales and rain to the southeastward. On the 16th the depression had moved to N. 57°, W. 17°, with a slight decrease in pressure, strong gales to the southward, and rain on the west coast of Scotland. From this locality it coursed southeastward to N. 54°, W. 14°, by 12 noon (Greenwich mean time) on the 17th, with rapidly decreasing pressure, fresh gales to the southward, and rain and moderate southerly gales along the Irish coasts. During the 17th the depression advanced eastward over the British Isles, beyond the region of marine reports.

7.—This depression appeared off the southern coast of Ireland, in about N. 49° 30', W. 9° 30', on the 19th, disappearing over the continent to the eastward on the same date, without developing special features.

8.—This depression is a continuation of low area number ix, traced over the North American continent, and first appears in the Gulf of Saint Lawrence, in N. 49°, W. 61°, on the morning of the 21st, with pressure ranging to 29.57 (751.1), rain and fresh winds to the southeastward. On the morning of the 22d the depression was central to the southeastward of its former position, in N. 47°, W. 56°, with an apparent increase in pressure and moderate to fresh gales and rain to the southeastward. From this location it moved northeastward to N. 50°, W. 53, by the morning of the 23d; from this position passing northeastward beyond the region of observation. No special data has been submitted relative to this storm.

9.—This depression appeared off the southern coast of Ireland on the 26th, with pressure about 29.50 (749.3), rain and moderate winds. During this date the storm moved south of east to N. 50°, W. 6°, on the 27th, with decreasing pressure

and fresh northwest gales off the southeast coast of Ireland. During the 27th the depression advanced eastward beyond the limit of marine observations.

10.—This storm, concerning which reports are meagre, first appeared off the western coast of northern Spain, in about N. 43°, W. 12°. Reports from as far south as N. 36° show fresh easterly gales on this date, and moderate winds and fair weather were reported in N. 49°. The depression pursued a northeasterly course to N. 45°, W. 8°, on the 31st, and apparently developed considerable energy, fresh gales and rain being reported to the northward, and fresh easterly gales to the southward.

OCEAN ICE.

On chart i are also exhibited the eastern and southern limits of the region within which icebergs and field ice have been observed during May, 1886. These limits have been determined from reports furnished by shipmasters, and from trustworthy data published in the "New York Maritime Register" and other newspapers. During this month the easternmost iceberg noted in reports at hand was observed in N. 48° 55', W. 46° 13', by the s. s. "Grecian Monarch," R. J. W. Bristow, commanding. The southernmost iceberg was observed in N. 41° 36', W. 51° 30'. Very heavy bodies of Arctic ice, with numerous icebergs, were encountered all along the Newfoundland and Cape Breton coasts, and off the southeastern edge of the "banks;" in many instances compelling vessels to deviate largely from their course. While the ice-drift in the trans-Atlantic ship routes has been less extensive than it usually is at this period, unusually heavy masses of field ice and icebergs have moved south to dangerous localities, and have floated over the "banks" in formidable numbers and size.

A comparison with the chart with that of the preceding month (April, 1886), shows a contraction of the ice limit to the westward; the eastern limit for May being about six degrees further west than that of the preceding month. The southern limit is about the same as the southern limit for April. As compared with May, 1885, the eastern limit is five degrees further west; the southern limit being about the same.

The following table shows the comparison between May, 1886, and the same month of the three preceding years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Lon. W.	Month.	Lat. N.	Lon. W.
May, 1883	40 30	47 00	May, 1883	45 40	45 12
May, 1884	41 30	47 30	May, 1884	43 30	44 50
May, 1885	40 50	48 15	May, 1885	42 30	40 10
May, 1886	41 36	51 30	May, 1886	48 55	46 13

Icebergs and field ice were reported during May, 1886, as follows:

May 1st.—S. S. "Wisconsin," in N. 42° 20', W. 49° 47', passed an iceberg; also, passed one in N. 42° 10', W. 51° 54', on the same date. The s. s. "City of Truro," in N. 49° 30', W. 50° 20', encountered quantities of drift ice. The s. s. "Buenos Ayrean," in N. 42° 20', W. 52° 12', passed a piece of ice. The s. s. "Victory," in N. 46° 06', W. — —, cleared the ice. The s. s. "Umbria," in N. 42° 53', W. 50° 19', saw a large iceberg, and in N. 42° 42', W. 52° 14', passed a small iceberg. The s. s. "Eider," in N. 41° 24', W. 49° 47', passed an iceberg of medium size.

2d.—S. S. "State of Nevada," in N. 42° 27', W. 51° 10', passed two large icebergs and two small pieces.

3d.—The ship "David Brown," in N. 42° 28', W. 51° 49', saw a large iceberg.

4th.—The bark "Orient" passed a large quantity of ice on the southeastern edge of the "banks." The s. s. "Norwegian," in N. 42° 15', W. 49° 53', passed a large iceberg. The bark "Cormorin," at the southeastern edge of the "banks," passed an iceberg 100 feet high. The s. s. "Sibe-

rian," in N. 47° 47', W. 49° 14', passed two large and several small icebergs; in N. 47° 47', W. 50° 13' passed a large iceberg with a quantity of detached ice around it; in N. 47° 47', W. 50° 47', passed a large iceberg.

5th.—S. S. "Siberian" passed through a very heavy field of ice, extending from Saint John's harbor, Newfoundland, E. $\frac{1}{4}$ N. 94 miles, dotted throughout with large icebergs. The easternmost limit of the field ice was in N. 47° 47', W. 50° 47', and extended as far north and south as the eye could reach.

6th.—S. S. "Adriatic," in N. 41° 43', W. 51° 21', passed a small iceberg. The s. s. "The Queen," in N. 41° 36', W. 51° 30', passed a large iceberg and two small pieces. The s. s. "City of Truro," in N. 49° 30', W. 50° 20', fell in with quantities of drift ice.

7th.—The s. s. "City of Truro," in N. 47° 40', W. 51° 50', at 5 a. m., passed a large iceberg and large quantities of drift ice. At 11 a. m., in N. 46° 41', W. 52° 8', fell in with large quantities of pack ice, being dangerous and difficult to get through; steamed around field fifty-eight miles to south. The weather was foggy most of the time while passing the ice, only clearing up at intervals; when about thirty miles from Saint John's, Newfoundland, fell in with large patches of field ice and many icebergs.

8th.—The s. s. "City of Truro," in N. 46° 16', W. 53° 20', at 3.30 a. m., passed several icebergs, being the last ice passed. Fog clearing at intervals.

8th.—S. S. "Amerique," in N. 41° 27', W. 50° 53', passed an iceberg ninety feet high, at 6.30 p. m.

10th.—S. S. "Shakspeare," in N. 43° 27', W. 51° 1', passed an iceberg.

11th.—S. S. "Polino," in N. 46° 20', W. 54° 40', passed fields of ice and numerous icebergs off the southeast coast of Newfoundland and Cape Race, and ice-fields as far up as N. 46° 20', W. 54° 40'. Passed strings of ice all along the Cape Breton coast and from Flint Island to Saint Paul Island; apparently full of ice between Cape North and Saint Paul. The s. s. "Siberian," after rounding Cape Race, encountered ice, extending as far south as the eye could detect from the mast-head, and passed a great many icebergs w. true wsw. off Cape Race, the most westerly one in N. 46° 25', W. 53° 59'.

12th.—The bark "Magnum" saw hundreds of icebergs north of the "banks," and could see them in every direction as far as the eye could reach.

15th.—S. S. "Corean" encountered an unusual number of icebergs from W. 49° to west of Cape Saint Mary, and quite an accumulation of large bergs about Cape Race on the evening of the 15th.

19th.—S. S. "Nova Scotian," in N. 49° 15', W. 48° 21', passed many small icebergs.

20th.—S. S. "Plover," "at Saint John's, Newfoundland, from the extreme north of Newfoundland." "The heaviest body of Arctic ice within its experience, moving rapidly southward in the track of Atlantic Ocean steamers; icebergs, among the floes, could be counted by hundreds." The s. s. "Nova Scotian" arrived at Saint John's, Newfoundland, and reported a field of ice two hundred miles wide, east of Newfoundland, and passed many small icebergs after leaving Saint John's.

23d.—S. S. "Bulgarian," in N. 43° 37', W. 49° 22' at 2 a. m., passed two medium-sized icebergs to the northward; also, portions of broken ice. The s. s. "Ontario," in N. 47° 34', W. 47° 01', passed four large icebergs, and forty-five miles west of that position passed one large berg. The s. s. "Hekla," in N. 43° 23', W. 49° 0', passed three icebergs.

24th.—S. S. "Grecian Monarch," in N. 48° 55', W. 46° 13', passed an iceberg.

25th.—S. S. "Grecian Monarch," in N. 47° 25', W. 50° 19', passed an iceberg, and in N. 47° 16', W. 50° 40', passed two bergs, one very large.

27th.—S. S. "Umbria," in N. 43° 10', W. 49° 0', passed several small pieces of ice.

28th.—S. S. "Buenos Ayrean," in N. 46° 47', W. 49° 0', passed an iceberg bearing north.

29th.—S. S. "Buenos Ayrean," in N. 46° 20', W. 52° 30', passed close alongside a large iceberg at 8.42 p. m.

30th.—S. S. "Buenos Ayrean," in N. 46° 20', W. 52° 58', passed a large iceberg.

31st.—S. S. "Gallia," in N. 42° 54', W. 50° 05' at 3.30 p. m., passed a large iceberg.

SIGNAL SERVICE AGENCIES.

Signal Service agencies have been established in the Maritime Exchange buildings at New York City and Philadelphia, and in the Custom-House, Boston, where the necessary blanks and other information will be furnished to ship-masters.

In pursuance of arrangements made with the Meteorological Office of London, England, there were cabled to that office from New York during May, 1886, nine reports concerning storms and icebergs encountered by vessels in the Atlantic west of the forty-fifth meridian; one message was sent from Boston.

TEMPERATURE OF THE AIR.

[Expressed in degrees, Fahrenheit.]

The distribution of mean temperature over the United States and Canada for May, 1886, is exhibited on chart ii by the dotted isothermal lines; and in the tables of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service.

In the following table are given the mean temperatures for the several geographical districts, with the normals and departures, as deduced from Signal Service observations:

Average temperatures for May.

Districts.	Average for May Signal-Service ob- servations.		Comparison of May, 1886, with the average for several years.
	For sev- eral years.	For 1886.	
	°	°	°
New England	54.7	54.6	- 0.1
Middle Atlantic States	61.9	60.9	- 1.0
South Atlantic States	69.9	70.1	+ 0.2
Florida Peninsula	76.5	75.8	- 0.7
Eastern Gulf States	72.3	71.4	- 0.9
Western Gulf States	73.0	74.0	+ 1.0
Rio Grande Valley	79.8	77.9	- 1.9
Tennessee	68.6	68.4	- 0.2
Ohio Valley	64.8	65.1	+ 0.3
Lower Lake region	56.8	55.9	- 0.9
Upper Lake region	51.1	51.8	+ 0.7
Extreme Northwest	52.4	55.8	+ 3.4
Upper Mississippi Valley	62.8	64.3	+ 1.5
Missouri Valley	59.9	63.8	+ 3.9
Northern slope	52.5	56.7	+ 4.2
Middle slope	59.3	65.6	+ 6.3
Southern slope	69.6	75.0	+ 5.4
Southern plateau	65.9	69.6	+ 3.7
Middle plateau	55.3	59.1	+ 3.8
Northern plateau	56.5	58.8	+ 2.3
North Pacific coast region	55.3	56.2	+ 0.9
Middle Pacific coast region	62.3	62.2	+ 0.1
South Pacific coast region	66.4	67.6	+ 1.2

On chart iv the departures from the normal temperature are illustrated by lines connecting stations of normal or equal abnormal values.

From this chart will be seen that the temperature for May was below the normal in all districts bordering on the lakes and the Gulf of Mexico; also in New England (except eastern Massachusetts and Connecticut), the middle Atlantic states, and generally in that portion of the country lying between the Alleghany Mountains and the Atlantic Ocean, except a strip of sea-shore extending from Cape Hatteras, North Carolina, to Jacksonville, Florida. The Mississippi Valley and all the country lying to the west, except central California, was above the normal, the excess being most marked in the middle slope, southern slope, and southern plateau, these regions averaging 6° above the normal.

In the districts where the mean temperature was below the normal the departures were generally slight.

The following are some of the most marked departures from the normal temperature at Signal Service stations:

Above normal.		Below normal.	
	°		°
West Las Animas, Colorado	8.4	Brownsville, Texas	3.5
Fort Elliott, Texas	7.2	Grand Haven, Michigan	3.0
Fort Sill, Indian Territory	6.5	Baltimore, Maryland	2.6
Huron, Dakota	6.2	New Orleans, Louisiana	2.4
Fort Apache, Arizona	6.1	Oswego, New York	2.2
Fort Smith, Arkansas	5.5	Washington City	2.1
Deadwood, Dakota	5.5	Mobile, Alabama	2.1
Prescott, Arizona	5.3	Galveston, Texas	1.8

DEVIATIONS FROM NORMAL TEMPERATURES.

In the table below are given, for certain stations, as reported by voluntary observers, the normal temperatures for May for a series of years, the mean temperature for May, 1886, and the departures from the normal:

Station.	County.	Normal tem- perature for May.	Number of years.	Mean tem- perature for May, 1886.	Departure.
Arkansas.					
Lead Hill	Boone	66.1	4	74.4	+ 8.3
California.					
Fall Brook	San Diego	60.9	10	62.0	+ 1.1
Sacramento	Sacramento	64.5	20	66.2	+ 1.7
Connecticut.					
Middletown *	Middlesex	56.9	28	56.7	- 0.2
Thompson *	Windham	56.5	30	55.9	- 0.6
Dakota.					
Webster	Day	55.5	3	62.6	+ 7.1
Illinois.					
Anna	Union	66.6	11	69.8	+ 3.2
Mattoon	Coles	64.3	6	68.0	+ 3.7
Riley	McHenry	56.9	25	57.9	+ 1.0
Sycamore	De Kalb	58.6	6	58.2	- 0.4
Indiana.					
Logansport	Cass	63.8	30	66.6	+ 2.8
Lafayette	Tippecanoe	62.7	7	62.3	- 0.4
Mauzy	Rush	60.4	6	62.0	+ 1.6
Spiceland	Henry	61.6	32	63.8	+ 2.2
Vevay	Switzerland	65.4	21	67.3	+ 1.9
Iowa.					
Cresco	Howard	58.1	10	60.1	+ 2.0
Monticello	Jones	59.7	33	61.1	+ 1.4
Kansas.					
Independence	Montgomery	66.4	15	71.9	+ 5.5
Lawrence	Douglas	65.5	18	68.5	+ 3.0
Wellington	Sumner	64.6	8	67.6	+ 3.0
Yates Center	Woodson	63.2	6	68.9	+ 5.7
Maine.					
Belfast *	Waldo	52.0	27	53.2	+ 1.2
Bridgeton *	Cumberland	53.9	11	53.4	- 0.5
Cornish	York	52.6	29	54.6	+ 2.0
Gardiner	Kennebec	53.4	50	54.0	+ 0.6
Orono *	Penobscot	52.3	18	53.4	+ 1.1
Maryland.					
Fallston	Harford	60.1	15	59.3	- 0.8
Massachusetts.					
Amherst	Hampshire	56.8	49	58.5	+ 1.7
Cambridge *	Middlesex	56.0	64	56.6	+ 0.6
Fitchburg *	Worcester	55.2	30	56.1	+ 0.9
New Bedford *	Bristol	54.6	74	55.3	+ 0.7
Springfield *	Hampden	58.9	19	60.0	+ 1.1
Somerset	Bristol	58.2	16	59.3	+ 1.1
Taunton *	Bristol	58.6	16	57.3	- 1.3
Williamstown *	Berkshire	56.5	32	56.7	+ 0.2
Nevada.					
Carson City	Ormsby	57.1	7	59.6	+ 2.5
New Brunswick.					
Saint John *	Saint John	47.0	26	48.9	+ 1.9
New Hampshire.					
Concord *	Merrimac	57.8	18	56.0	- 1.8
Hanover *	Grafton	55.5	21	54.7	- 0.8
New York.					
North Volney	Oswego	53.1	19	54.1	+ 1.0
Palermo	Oswego	53.2	33	52.6	- 0.6
Plattsburg Barracks	Clinton	54.6	17	55.2	+ 0.6
Ohio.					
Wauseon	Fulton	58.7	16	60.4	+ 1.7
Westerville	Franklin	59.7	10	61.4	+ 1.7
Pennsylvania.					
Dyberry	Wayne	54.7	20	54.4	- 0.3
South Carolina.					
Stateburg	Sumpter	70.1	6	71.5	+ 1.4
Texas.					
New Ulm	Austin	74.5	14	76.1	+ 1.6
Vermont.					
Lunenburg *	Essex	52.3	38	52.3	0.0
Newport *	Orleans	55.9	12	55.4	- 0.5
Stratford	Orange	56.2	12	55.7	- 0.5
Virginia.					
Bird's Nest	Northampton	65.0	18	66.8	+ 1.8
Dale Enterprise	Rockingham	61.9	6	67.3	+ 5.4
Variety Mills	Nelson	63.6	9	63.3	- 0.3
West Virginia.					
Helvetia	Randolph	58.1	10	58.4	+ 0.3

* From the "Bulletin of the New England Meteorological Society."

In connection with this subject the following notes are furnished by voluntary observers: